CLAIMS

1. A rotation transmission member comprising:

a substantially ring-shaped rotation transmission portion; and

a supporting portion that is placed on an inner side of the rotation transmission portion and has a substantially circular cylinder shaped through hole that is formed by an inner circumferential surface, and that supports the rotation transmission portion, wherein

the inner circumferential surface is provided with:

a smooth ring-shaped surface that is placed adjacent to one end of the inner circumferential surface; and

a plurality of protrusion shaped portions that, taking the ring-shaped surface as a basis, protrude inwards in the radial direction, and extend along a portion of the length in the axial direction of the through hole.

2. A rotation transmission member according to claim 1, wherein the protrusion shaped portions are a plurality of convex bars that extend rectilinearly from one end of the ring-shaped surface to an end portion of the through hole.

3. A rotation transmission member according to claim 2, wherein the plurality of convex bars are placed equally in the circumferential direction of the inner circumferential surface.

4. A rotation transmission member according to claim 1, wherein the rotation transmission portion and the supporting portion are formed integrally.

5. A rotation transmission member according to claim 4, wherein the rotation transmission member is a sintered component that is manufactured by powder molding and sintering.

6. A rotation transmission assembly comprising:

a rotation transmission member formed in a substantially circular plate configuration, in a center of which there is a substantially circular cylinder shaped through hole that is formed by an inner circumferential surface, and that comprises a rotation transmission portion located on an outer circumferential portion of the rotation transmission member; and

an inner side member that is press-inserted into the through hole, wherein

the inner circumferential surface of the rotation transmission member is provided with:

a smooth ring-shaped surface that is placed adjacent to one end of the inner circumferential surface; and

a plurality of protrusion shaped portions that, taking the ring-shaped surface as a basis, protrude inwards in the radial direction, and extend along a portion of the length in the axial direction of the through hole, and wherein

the inner side member and the rotation transmission member mesh with each other within the range in which the protrusion shaped portions extend, and are in surface contact with each other within a range in which the ring-shaped surface extends.

7. A rotation transmission assembly according to claim 6, wherein the protrusion shaped portions are a plurality of convex bars that extend rectilinearly from one end of the ring-shaped surface to an end portion of the through hole.

8. A rotation transmission assembly according to claim 7, wherein the plurality of convex bars are placed equally in the circumferential direction of the inner circumferential surface.

9. A rotation transmission assembly according to claim 6, wherein at least one of the rotation transmission member and the inner side member is a sintered component that is manufactured by powder molding and sintering.

10. A rotation transmission assembly according to claim 6, wherein the rotation transmission member is formed as a gear that has a plurality of teeth on the rotation transmission portion, and the inner side member is formed as a cylindrical bearing member.

11. A gear mechanism that is provided with the rotation transmission assembly described in claim 10.

12. A method for assembling a rotation transmission assembly that is provided with a rotation transmission member and an inner side member, wherein

the rotation transmission member formed in a substantially circular plate configuration, has a substantially circular cylinder shaped through hole that is formed by an inner circumferential surface in the center thereof, and comprises a rotation transmission portion located on an outer circumferential portion of the rotation transmission member, and wherein

the inner circumferential surface of the rotation transmission member is

provided with:

a smooth ring-shaped surface that is placed adjacent to one end of the inner circumferential surface; and

a plurality of protrusion shaped portions that, taking the ring-shaped surface as a basis, protrude inwards in the radial direction, and extend along a portion of the length in the axial direction of the through hole, and wherein

the inner side member is formed in a substantially circular cylinder shape whose diameter is larger than an inner diameter of the ring-shaped surface and that has a smooth outer circumferential surface,

the method comprising the steps of:

placing the inner side member adjacent to the ring-shaped surface of the rotation transmission member; and

press-inserting the inner side member into the through hole in the rotation transmission member so that one end of the inner side member goes beyond the protrusion shaped portions.

13. A rotation transmission assembly comprising:

a rotation transmission member formed in a substantially circular plate configuration, in a center of which there is a substantially circular cylinder shaped through hole that is formed by an inner circumferential surface, and that comprises a rotation transmission portion located on an outer circumferential portion of the rotation transmission member; and

an inner side member whose length in the axial direction is longer than the through hole, and that is formed in a substantially circular cylinder shape and is press-inserted into the through hole, wherein

both end portions of the inner side member protrude as protruding portions from end portions of the inner circumferential surface of the rotation transmission member, and at least one portion of the protruding portions is made to protrude outwards in the radial direction beyond the diameter of the inner circumferential surface by plastic deformation, and is tightly adhered to the end portion of the inner circumferential surface.

14. A rotation transmission assembly according to claim 13, wherein a plurality of chamfered portions that each have a different chamfer angle are formed on an inner surface of each end portion of the inner side member.

15. A rotation transmission assembly according to claim 13, wherein the inner circumferential surface of the rotation transmission member has a plurality of convex bars that extend over the length of the through hole, and the inner side member meshes with the plurality of convex bars as it is deformed.

16. A rotation transmission assembly according to claim 13, wherein the rotation transmission member is formed as a gear that has a plurality of teeth on the rotation transmission portion, and the inner side member is formed as a bearing member.

17. A gear mechanism that is provided with the rotation transmission assembly according to claim 16.

18. A method for assembling a rotation transmission assembly that is provided with a rotation transmission member and an inner side member, wherein

the rotation transmission member formed in a substantially circular plate

configuration, has a substantially circular cylinder shaped through hole that is formed by an inner circumferential surface in the center thereof, and comprises a rotation transmission portion located on an outer circumferential portion of the rotation transmission member; and wherein

the inner side member is formed in a substantially circular cylinder shape whose length in the axial direction is longer than the through hole and whose outer diameter is larger than the inner diameter of the ring-shaped surface, and that has a center hole that penetrates the substantially circular cylinder shape,

the method comprising the steps of:

press-inserting the inner side member into the through hole in the rotation transmission member so that both ends of the inner side member are made to protrude from the through hole as protruding portions; and

plastically deforming at least a portion of both protruding portions so as to protrude outwards in the radial direction beyond the diameter of the inner circumferential surface, and so as to tightly abut against an end portion of the inner circumferential surface.

19. A method according to claim 18, wherein the step that plastically deforms the two protruding portions is performed by pushing two tools that have conical surfaces whose maximum outer diameter is larger than the diameter of the center hole of the inner side member into the center hole.

20. A method according to claim 19, wherein inner surfaces of both end portions of the inner side member have a first chamfered portion, and apex angles of the respective conical surfaces of the two tools are smaller than an apex angle of a conical surface that

prescribes the first chamfered portion, and in the step that plastically deforms the two protruding portions, a second chamfered portion whose chamfer angle is different from that of the first chamfered portion is formed on the inner circumference of the two end portions of the inner side member.

21. A rotation transmission assembly comprising:

a rotation transmission member formed in a substantially circular plate configuration, in a center of which there is a substantially circular cylinder shaped through hole that is formed by an inner circumferential surface and extends from a first end portion to a second end portion, and that comprises a rotation transmission portion located on an outer circumferential portion of the rotation transmission member; and

an inner side member that is press-inserted into the through hole, wherein

the inner circumferential surface of the rotation transmission member comprises:

a smooth ring-shaped surface that is placed adjacent to the first end portion; and

a plurality of convex bars that, taking the ring-shaped surface as a basis, protrude inwards in the radial direction, and extend rectilinearly from one end of the ring-shaped surface to the second end portion, and wherein

the inner side member and the rotation transmission member mesh with each other within the range in which the convex bars extend, and are in surface contact with each other within a range in which the ring-shaped surface extends, and one end portion of the inner side member protrudes as a protruding portion from the second end portion of the inner circumferential surface, and at least one portion of the protruding portion is made to protrude outwards in the radial direction beyond the diameter of the inner circumferential surface by plastic deformation, and is tightly abutted against the second end portion of the inner circumferential surface.

22. A rotation transmission assembly according to claim 21, wherein a plurality of chamfered portions that each have a different chamfer angle are formed on an inner surface of each end portion of the inner side member.

23. A rotation transmission assembly according to claim 21, wherein the rotation transmission member is formed as a gear that has a plurality of teeth on the rotation transmission portion, and the inner side member is formed as a bearing member.

24. A gear mechanism that is provided with the rotation transmission assembly according to claim 23.

25. A method for assembling a rotation transmission assembly that is provided with a rotation transmission member and an inner side member, wherein

the rotation transmission member formed in a substantially circular plate configuration, has a substantially circular cylinder shaped through hole that is formed by an inner circumferential surface in the center thereof, and comprises a rotation transmission portion located on an outer circumferential portion of the rotation transmission member, and wherein

the inner circumferential surface of the rotation transmission member is provided with:

a smooth ring-shaped surface that is placed adjacent to the first end portion of the inner circumferential surface; and

a plurality of convex bars that, taking the ring-shaped surface as a basis, protrude inwards in the radial direction, and extend rectilinearly from one end of the

ring-shaped surface to the second end portion of the inner circumferential surface, and wherein

the inner side member is formed in a substantially circular cylinder shape whose diameter is larger than an inner diameter of the ring-shaped surface and that has a smooth outer circumferential surface,

the method comprising the steps of:

placing the inner side member adjacent to the first end portion of the inner circumferential surface of the rotation transmission member;

press-inserting the inner side member into the through hole in the rotation transmission memberso that one end of the inner side member is made to protrude from the second end portion of the inner circumferential surface as a protruding portion; and

plastically deforming at least a portion of the protruding portion so as to protrude outwards in the radial direction beyond the diameter of the inner circumferential surface, and so as to tightly abut against an end portion of the inner circumferential surface.

26. A method according to claim 25, wherein the inner side member is formed in a substantially circular cylinder shape and has a center hole that penetrates the substantially circular cylinder shape, and the step that plastically deforms the protruding portion is performed by a diameter enlarging step in which a tool that has a conical surface whose maximum outer diameter is larger than the diameter of the center hole of the inner side member is pushed into the center hole.

27. A method according to claim 26, wherein the protruding portion of the inner side member has a first chamfered portion on an inner side thereof, and an apex angle of the

conical surface of the tool is smaller than an apex angle of a conical surface that prescribes the first chamfered portion, and in the diameter enlarging step, a second chamfered portion whose chamfer angle is different from that of the first chamfered portion is formed on an inner side of the protruding portion of the inner side member.